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The purpose, method, and findings are given for each of 55 research studies in agricultural education completed in 1966-67 in the 13 states of the American Vocational Central Region. Also listed are the 66 investigations which were in progress in 1967-68. Summaries are arranged alphabetically by author and are available for loan from university libraries, university departments of agricultural education, or state departments of vocational and technical education. A subject index is provided. (DM)

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SUMMARIES OF STUDIES IN AGRICULTURAL EDUCATION CENTRAL REGION, 1966-67

An Annotated Bibliography of Studies in Agricultural Education

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The Department of Agricultural Education
College of Agriculture and Home Economics
The Ohio State University
Columbus, Ohio 43210

July, 1968

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SUMMARIES OF STUDIES IN AGRICULTURAL EDUCATION

CENTRAL REGION

1966-67.

Compiled by
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Issued by

The Department of Agricultural Education
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July, 1968

INTRODUCTION

This compilation of research in agricultural education includes 55 studies completed during 1966-67 in the 13 states of the Central Region. A list of studies in progress in 1967-68 is included also.

Abstracts of research completed in 1966-67 were reported by teacher education institutions and state departments of education in the Region. All studies reported are available for loan from university libraries, departments of agricultural education in universities, and state departments of vocational and technical education.

This compilation of abstracts of research in agricultural education is an activity of the Research Committee of the Agricultural Education Division of the American Vocational Association.

J. Robert Warmbrod
Central Region Representative
Research Committee
Agricultural Education Division
American Vocational Association

July, 1968

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SUMMARIES OF STUDIES, 1966-1967

1. BARKER, RICHARD LELAND. An Appraisal of Instructional Units to Enhance Student Understanding of Profit-Maximizing Principles. Dissertation, Ph.D., 1967, The Ohio State University, 231 pp. Library, The Ohio State University, Columbus.

Purpose. To measure the relative effectiveness of instructional units designed to enhance student understanding of profit-maximizing principles when used in classes of vocational agriculture.

Method. Twenty-two high schools offering vocational agriculture to 262 juniors and seniors in Ohio performed the trial function and assisted in evaluating the farm management instructional units. Six schools, designated as control schools, taught farm management in the traditional manner. Seven schools were assigned as pilot-block to teach from the units in an uninterrupted sequence while nine schools were designated as pilot-integrated to use the same materials by integrating them with other subject matter. Student understanding of profit-maximizing principles was measured by a posttest. Analysis of variance and Duncan's multiple-range statistic were used to determine the significance of difference among the posttest scores achieved by students comprising the three groups. Thirteen independent variables were subjected to the Pearson product-moment correlation, the t test, or the F test to determine their association with student understanding.

Findings. The pilot-block group of students obtained the highest score on the posttest. This group was followed in sequence by the pilot-integrated and control groups. Differences in scores were significant above the .05 level indicating that the pilot-block technique was superior to either the pilot-integrated or the traditional techniques. The statistical analysis also indicated that the pilot-integrated technique enhanced student understanding of profit-maximizing principles to a greater extent than did the traditional technique.

Student understanding of profit-maximizing principles was significantly associated with four independent variables: (1) student year in vocational agriculture, (2) student years of farm experience, (3) student I. Q., and (4) number of teachers in the vocational agriculture department. Teacher subjective appraisal of the units revealed that the principles approach to farm management instruction strengthened the vocational agriculture curriculum. They found the units challenging, time consuming, and requiring extra study. Yet this extra preparation and greater teaching efforts tended to result in greater student interest and achievement.

2. BEAVER, RONALD DEAN. Competencies in Farm Labor Utilization Needed by Farmers. Thesis, M.S., 1967, Iowa State University of Science and Technology, 119 pp. Library, Iowa State University of Science and Technology, Ames.

Purpose. To determine competencies in farm labor utilization needed by farmers, to determine the degree the competencies were needed and possessed by farmers, and to identify relationships between competencies needed and possessed and certain characteristics of farmers and farming operations.

Method. The competencies were determined utilizing a panel of consultants consisting of farmers, vocational agriculture instructors, and Iowa State University staff members. Questionnaires were mailed to a random sample of Iowa farmers and to farmers selected by Iowa vocational agriculture instructors as being efficient labor managers. Responses were received from 145 selected and 59 random sample farmers.

Findings. Selected and random sample farmers indicated at least some competence needed in all competencies investigated. Competencies ranked highest by both selected and random sample farmers for degree of competence needed were understanding (1) the importance of timeliness of operations in crop and livestock production and (2) when farm operator time is more profitably utilized in management activities than as labor. Abilities ranked highest by both groups for degree of competence needed were to (1) recognize conditions and circumstances requiring immediate attention and labor, (2) anticipate and prepare for peak work loads in the farm work schedule, (3) arrange buildings, facilities and field layout to save labor and increase profits, and (4) use tillage and cropping practices and equipment which save labor and increase profits. Neither group had a larger mean score for degree of competence possessed than for degree of competence needed in any specific competency. Large differences between the degree of competence needed and possessed mean scores, indicating need for additional competence, were found in seven competencies for selected farmers and in fifteen competencies for random sample farmers.

Farmers indicating the greatest overall need for competence in labor management were (1) farmers with highest educational levels, (2) farmers with the most years of farming experience, (3) members of farm partnerships, (4) operators of largest acreages, (5) livestock producers, and (6) employers of largest amounts of hired and total labor. At least 49 competencies were considered necessary for efficient utilization of farm labor and could serve as a basis for farm labor management instruction in agricultural education programs for present and prospective farmers.

3. BERKEY, ARTHUR L. The Importance of Activities Performed in Functions of the Farm Machinery Industry as a Basis for Training Programs. Thesis, Ph.D., 1967, Michigan State University, 173 pp. Library, Michigan State University, East Lansing.

Purpose. To identify the functions performed at the retail dealership level of the farm machinery industry and to determine the importance of activities that should be performed in fulfilling the selected functions of retail sales and records and accounts.

Method. The functions of the retail farm machinery industry were identified through a review of the literature and assistance from industry and university personnel. The retail sales and the records and accounts functions were selected for study. A procedure similar to that used to identify functions was used to list activities performed in each of the selected functions. A 21-member jury of experts was composed of retail dealership managers, industry advisors representing full-line farm machinery manufacturers, and educational experts involved in farm machinery training programs. Through interviews jury members rated the importance of activities to the performance of the selected functions and listed additional activities important to the functions. Frequency of the importance ratings was used to identify activities important to the selected functions. The relative importance of individual activities was determined by ranking and statistical tests which compared rating frequencies with a random distribution. Differences between jury groups in total function ratings were determined by clustering using McQuitty's Hierarchical Classification System.

Findings. Retail sales, records and accounts, management, and service were the four functions identified. Seventy-two activities including 17 common activities were identified for both the retail sales and the records and accounts functions. Jury members added eight and three activities, respectively, to the functions. The frequencies of the importance ratings of a majority of the 72 activities in each selected function were not statistically significant from a random frequency. Common activities were not significantly different in importance for the two functions. No significant differences existed between jury groups in their importance ratings of activities. Activity rankings failed to show individual activities in one activity group ranking higher as a group than activities in other activity groups.

It was concluded that the activities identified were essentially those important to the functions, that the results of this study may be useful in developing training programs, that other common activities identified may be related, and that activity groups and differences in activity importance may have implications for curriculum.

4. BODE, JOHN C. Factors Which Influence Attendance in an Adult Farmer Class. Thesis, M.S., 1967, Iowa State University of Science and Technology, 78 pp. Library, Iowa State University of Science and Technology, Ames.

Purpose. To identify the factors which contributed to an increase in attendance at an adult farmer class, to develop suggested practices which encourage attendance, and to make the information available to teachers conducting adult education in agriculture.

Method. Attendance of the vocational agriculture adult farmer class at Sheffield-Chapin Community School, Sheffield, Iowa, increased from an average of 15 members per meeting during 1961 and 1962 to an average of 64 members per meeting during the 1963 to 1966 period. Members who did not regularly attend the adult farmer class during the two years prior to 1963 and who had since become regularly attending members were selected for the study.

An individual was considered a regularly attending member if he attended six or more meetings per year. One hundred individuals qualified for the study. Adult advisory council members and the investigator compiled a list of 31 factors which may have contributed to the increase in attendance. A schedule designed to obtain evaluation of the factors was administered by the investigator.

Findings. Factors evaluated as exerting the most favorable influence toward attendance were: class topics important to the operation of farm business, learn something at each meeting, weekly reminder letters, use of movies and filmstrips, and use of outside speakers. The four factors evaluated as exerting the least amount of influence toward attendance were: presentation of door prizes, presentation of attendance certificates, joint meetings with wives, and posters in local business establishments. Ninety-nine per cent of the class members indicated that the adult farmer class had exerted a positive influence in building better school-community relationships.

5. BUSSE, NORMAN LEE. A Ten Unit Presentation of Teaching Outlines for a Unit Operation Method of Instruction in Farm Machinery. Colloquim paper, M.S., 1966, University of Minnesota, 155 pp. Library, Department of Agricultural Education, University of Minnesota, St. Paul.

Purpose. To prepare and consolidate lesson plans for teaching farm machinery by basic operational functions rather than by individual machines.

Method. The writer selected as a format for this study the dissertation, An Analysis of the Unit Operation Method of Instruction in Vocational Agriculture, by R. Paul Marvin, University of Minnesota, 1960. Materials were gathered and consolidated into lesson plans based on ten basic functions of agricultural farm machinery. The major farm machines were categorized as to their basic operational functions and used as illustrations for the integral structure of each lesson plan. The simple machines were incorporated to show the relationship of the simple type machines to the more complex types used in agriculture today.

Findings. Teaching outlines for farm machinery using the unit operation method of instruction were prepared for the following ten functions: cutting and shearing, conveying, metering, packing, positioning, mixing, separating, preparing, rotating, and reducing. Each unit includes suggested teaching materials as well as a basic lesson outline of the presentation developed around a major farm machine function. The result is a reduction in relative teaching time for the enterprise of farm machinery. Due to the increasing number of farm machines, considerable repetition is involved in the instruction of farm machinery by the individual machine method. This repetition suggests lost time which can be overcome through teaching farm machinery by the unit operation method.

6. CARPENTER, FRANK R. A Study of the Relationship Between Selected Educational Experiences of Vocational Agriculture Students and Their Enrolling in a College of Agriculture. Thesis, Ph.D., 1967, University of Missouri, 125 pp. Library, University of Missouri, Columbia.

Purpose. To determine whether or not selected educational experiences of vocational agriculture students tended to be related to the students' enrollment in the College of Agriculture.

Method. The study attempted to determine if there was a relationship between selected variables. The variables investigated were attendance at the Kansas State University agricultural science days, participation in judging contests, attendance at state FFA conventions or other events on the University campus and later enrollment in the College of Agriculture. The study also sought to answer whether or not certain teaching techniques of vocational agriculture instructors or the formal education levels and professional improvement efforts of the teachers were significantly related to their students' attendance in the College of Agriculture. Inquiry was also made as to the effect selected FFA leadership activities might have on College of Agriculture attendance and the extent which high schools might vary in the percentage of their students who entered the College of Agriculture.

Findings. High school student participation in the state judging contests at Kansas State University was the only on-campus activity tested in which there was a significant relationship to attendance in the College of Agriculture. No significant difference was found between students' attendance at Engineers' Open House, at Veterinary Medicine Open House, at Agricultural Science Day, at practice judging on campus or in visiting with Agriculture faculty or students enrolling in the College of Agriculture. Neither vocational agriculture students' participation in area conferences, college faculty speaking at FFA banquets or meetings nor college students' talking to high school FFA groups was significant when tested against attendance in the College of Agriculture.

Posting scholarship records was the only teaching procedure which was significantly related to the College attendance. Teachers with M.S. degrees tended to take students to the campus to visit faculty more than did teachers with B.S. degrees. Teachers who attended Agricultural Science Day also tended to spend more time visiting with parents on the subject of their sons' attending college. Teachers with M.S. degrees tended to visit with a higher percentage of parents about their sons' attending college. Teachers who visited with parents most were also the teachers who frequently posted scholarship records.

7. CHRISTENSEN, HOWARD HARWARD. A Program in Agricultural Education in Nevada Based on Off-Farm Agricultural Occupations. Dissertation, Ph.D., 1966, The Ohio State University, 290 pp. Library, The Ohio State University, Columbus.

Purpose. To investigate the further development of the program of agricultural education in Nevada in light of current and future opportunities for employment in off-farm agricultural occupations.

Method. Personal interviews were made with all firms and government agencies in the state which appeared to be agricultural. This included 363 firms and 30 agricultural agencies. The findings were summarized only for those interviews where the employer indicated that some employees needed an agricultural background or training. The summaries of 148 companies, with a study of the factors that inhibit or enhance vocational-technical education in Nevada, were the basis for determining the improvements and adjustments that could be made in all agricultural education programs.

Findings. Employment in off-farm agricultural occupations was low in comparison to other employment. Nevada had 1,985 employees engaged in off-farm agricultural occupations in 1965 which represented about one-fifth of all persons engaged in agricultural employment. Employment in off-farm agricultural occupations was limited to a few locations. Off-farm agricultural workers were employed in only 118 different firms and 30 government agencies in the state. Seventy-eight per cent of these employees were located in two counties--Clark and Washoe. Off-farm agricultural workers were generally employed in small businesses. About 80 per cent of the employers in private firms had less than 25 employees. Nearly half of all off-farm agricultural employment was in government agencies in Nevada. Employers predicted a moderate growth in new positions in off-farm agricultural occupations. This expansion was predicted at the rate of 6 per cent per year. In addition, the replacement ratio for current employees was 16 per cent which, when added to the new employees, represented a need of 454 new employees each year. Sixty per cent of Nevada's off-farm agricultural employment was in the function of service and 35 per cent was in sales. Few employees were engaged in the manufacturing and processing of agricultural products.

Employers generally desired employees who had graduated from high school and seemed likely to stay on the job for some time. Nevada vocational educators generally believed that vocational programs had been enhanced by school consolidation, appointment of local directors, favorable state reimbursement, and efficient use of available funds by the State Division of Vocational-Technical Education. They also believed that agricultural education programs have been inhibited by lack of adequate financing, small numbers of off-farm agricultural firms, and rapid teacher turnover.

About 72 per cent of the employers indicated their employees needed a broad general education plus competency in agriculture, particularly in agronomy, horticulture, irrigation, and soils. In addition, they wanted employees who have training in economics including general business management. They also indicated that training in agricultural mechanics, including farm machinery repair and maintenance was necessary for many employees.

8. DANGAS, STEFANOS E. A Study of the Need for the Introduction of Vocational Agricultural Departments in Greece. Colloquium paper, M.S., 1966, University of Minnesota, 72 pp. Library, Department of Agricultural Education, St. Paul.

Purpose. To examine the need for establishing agricultural education programs at the secondary level and to project the possibilities of improving training of farmers.

Method. Agricultural problems were identified. A study was made of the current educational system, both general and vocational education at elementary and secondary levels with special focus on agricultural and homemaking education, in order to identify the degree and extent to which farmers are educated. An investigation was made of the proposed legislation affecting agricultural education in Greece and its implementation.

Findings. Agriculture, an old occupation for villagers in Greece, is changing. Farming has become more specialized, more commercial, and more technical. In the immediate future no serious changes are expected, but the number of persons working in agri-business will increase considerably. Enrollment of farmers' children in agricultural education courses designed to prepare them as skilled workers will not succeed unless the rural environment improves. Education, mainly academic in elementary and secondary levels, was structurally defective until 1964 when it was reorganized to extend compulsory attendance from six to nine years. This reformation is expected to have significant impact upon rural youth. Vocational and technical education is also to be reorganized. Thus, new legislation is being prepared for this purpose. The study recommends that the introduction of agriculture and homemaking programs be started in a few rich agricultural regions. Curriculum plans, instructional staff required, and obtaining equipment were also discussed.

9. DIENER, TRUMAN LEROY. Agriculture Mechanics Activities for High School Students. Master's report, 1967, Kansas State University. Library, Kansas State University, Manhattan.

Purpose. To secure the opinions of parents concerning what abilities they considered high school graduating seniors should be able to perform. The study pertained to agricultural mechanics skills.

Method. Eighteen parents were interviewed. The population consisted of the parents of Hillsboro High School rural male graduates for the years 1966 and 1967. A questionnaire was developed to give parents an opportunity to select which abilities they considered important. The questionnaire included twenty areas. Each of the areas was broken down into a number of skills or abilities, and the parents were asked to study each ability in each area and mark the abilities they thought a rural male high school graduate should be able to achieve.

Findings. The responses of parents were rather consistent as to the need of various abilities. The data show that fifteen abilities out of the ninety-nine were marked by 100 per cent of those interviewed. The data further indicate that 28 per cent of the abilities were marked as necessary by 90 per cent or more of the respondents, while only 1 per cent of the abilities were marked by less than 9 per cent of the respondents. Seventy per cent of parents of rural male graduates of Hillsboro High School for the years 1966 and 1967 marked 58 per cent of the abilities as needed for high school graduates. The responses to the questionnaire showed that 40 per cent of the abilities were selected by not less than 10 per cent and not more than 69 per cent of the parents interviewed.

10. ECK, ROY F. Competencies for Gainful Employment by Dealerships of the Farm Machinery Industry in Northeast Kansas. Master's report, 1967, Kansas State University. Library, Kansas State University, Manhattan.

Purpose. To discover some competencies needed by employees of farm machinery dealers in order that vocational agriculture departments, vocational technical schools, and junior colleges could qualify their graduates for gainful employment with farm machinery dealers.

Method. The responses to a questionnaire completed by dealers were analyzed. Items which were rated as "essential" were assigned 4 points; "very important," 3 points; "important," 2 points; "little importance," one point; and "no importance," 0 points. All competencies receiving an average rating of "essential" (3.0 to 4.0 points) were to be considered as important in developing a training curriculum.

Findings. The ten farm machinery dealers rated 75 from a total of 93 competencies as "essential" for employment in the farm machinery industry. These 75 competencies could be considered by the vocational agriculture departments, vocational technical schools, and junior colleges in developing curricula for gainful employment with farm machinery dealers. The area farm machinery dealers rated 84 of the 93 competencies as "essential," eight as "very important," and one as "important." The Atchison dealers rated 56 as "essential," 35 as "very important," and two as "important." The area dealers rated more of the competencies as "essential" than did the Atchison dealers. All ten dealers would employ from one to three men if they were qualified.

All companies sponsored clinics for the training of employees of dealerships. Eight dealers held clinics for mechanics with the dealers paying tuition fees. All ten dealers had night clinics at the dealership for machinery assembly and adjustment personnel and seven dealers had clinics for parts and sales personnel. Fourteen machines were reported as being repaired and serviced by each of the ten dealers. The other machines which dealers reported that they repaired and serviced were as follows: small engines, small garden tractors, and anhydrous ammonia applicators. All ten dealers reported that they did not intend to add additional services unless it was necessary to increase the efficiency of the dealership.

11. EKLUND, ROGER NELS. The Occupational Status of Rural Parents and Implications for Changing the Program of Vocational Agriculture and Vocational Education of the Cambridge School Area. Colloquium paper, M.A., 1966, 74 pp. Department of Agricultural Education, University of Minnesota, St. Paul.

Purpose. To determine the occupational status and educational background of the rural parents in the Cambridge school area and to determine the vocational needs of the students and adults in the area.

Method. A questionnaire was sent 398 randomly selected families having rural routes in the 1966 Cambridge School Census. From the 55 per cent return, families were grouped into four categories by size of farm residence.

Findings. Fifty per cent of the rural parents were farming either full or part-time. Eighteen per cent were on farms larger than 160 acres. Twenty-six per cent of the rural parents have residences of less than one acre and are typically new in the community. All fathers living on less than 40 acres are employed off the farm, and about 40 per cent of the mothers are employed off the farm regardless of residence size. Seventeen per cent of the part-time farmers have some formal schooling after high school. Fathers who are full-time farm operators are generally older and have lived in the community longer. Eighty-five per cent of the parents living on farms of 40 acres or more have some income from the farm. Most of the occupations listed by fathers were in the trades and industrial fields with 8.8 per cent in occupations requiring four or more years of college. As the acreage of the part-time farmer increased, the distance from place of residence to employment increased. Three-fourths of the mothers were employed within 15 miles of home.

The rural parents ranked vocational areas for boys that they felt would be desirable as follows: agricultural education, 60 per cent; agri-business, 68 per cent; trades and industries, 91 per cent; distributive education, 86 per cent; and office education, 69 per cent.

12. FERRIES, JAMES H. Development of an Achievement Test in Soil Science for Wisconsin High School Vocational Agriculture Students. Thesis, M.S., 1967, Wisconsin State University - River Falls, 62 pp. Library, Wisconsin State University, River Falls.

Purpose. To develop a standardized test instrument for the measurement of achievement in the study of soil science.

Method. Sample questions concerning soil science were constructed. Authentication of these items was achieved through the cooperation of three experts in the field of soil science. From these questions the test was constructed. The instructors in thirty-nine schools (694 pupils) administered the tests at the end of the unit of study in advanced soils. Individual test items were analyzed and test scores were compared with other indices of student achievement. Percentile ranks were computed based on the 694 scores.

Findings. The test appeared to be a valid and reliable instrument for the measurement of achievement in soil science. Average agricultural grades and average academic grades were indicative of student scores on the soil science test. The test included items relating to six areas of soil science: soil origin, formation, classification, and profiles; land use and tillage; drainage and conservation; soil organisms and micro-organisms; liming and acidity; and fertility and fertilizers.

13. GENEREAUX, DOUGLAS G. Annual Estimated Replacement Farmer Opportunities in Nebraska. Staff study, 1967, Department of Agricultural Education and Research Coordination Unit, University of Nebraska, 10 pp. Library, Department of Agricultural Education, University of Nebraska, Lincoln.

Purpose. To determine the number of farmer replacements needed in Nebraska annually.

Method. The procedure was to estimate the ratio of farm consolidation and farmer retirement using a formula developed at Iowa State University. The United States Population Census and the United States Census of Agriculture were the source documents used. Assumptions upon which estimates were based were: (1) farmers tend to retire at age 65 making all or part of their farm units available to other farmers; (2) the projected farm consolidation rate can be based on the trend of the past five years; and (3) farmers under 55 years of age tend to leave the farm for reasons other than retirement at a rate of 1.5 per cent annually.

Findings. In the 93 Nebraska counties, there are an estimated 957 opportunities for young men to go into farming annually. This figure represents 34.9 per cent of the 2,725 seventeen-year-old rural males estimated in 1969. The greatest need for replacement farmers was found in eastern and central Nebraska.

Census figures show that in Nebraska there were 100,846 farms in 1954; 90,475 farms in 1959; and 80,163 farms in 1964. Projecting from the individual county totals, farm numbers should decrease by just over 1,800 farms each year. This would leave 71,145 farms in 1969. Farming opportunities range from a high of an estimated 31.4 in Knox County to an estimated low of 18.0 in Douglas County. The average is 10.2 opportunities per county per year.

14. GIFFIN, ERNEST R. Achievement in Selected High School and College Courses and the Number of Years of High School Vocational Agriculture Completed. Thesis, M.S., 1967, Wisconsin State University-River Falls, 55 pp. Library, Wisconsin State University, River Falls.

Purpose. To determine the relationship between the number of years of high school vocational agriculture completed and achievement in selected agriculture and general education courses by juniors in the College of Agriculture, Wisconsin State University-River Falls.

Method. The population for the study included 113 juniors from the 1966-67 class in the College of Agriculture at the Wisconsin State University-River Falls. Data were compiled from individual college records and high school transcripts filed in the registrar's office. Courses in the general education field and in agriculture were selected for study.

Findings. The following conclusions were made from the findings in this study: (1) Over 85 per cent of the students in this study had been enrolled in high school vocational agriculture three or more years; (2) students with three or more years of high school vocational agriculture achieved as well or slightly better in college than did those with less than three years of high school vocational agriculture; (3) high school achievement was a good predictor of success in the university courses studied; (4) for students with three years or more of vocational agriculture, the following positive relationships were noted: (a) achievement in high school English and achievement in all university courses except economics; (b) achievement in high school mathematics and university courses in agronomy, animal science, agricultural engineering, chemistry, English, psychology, biology, and social science; (c) achievement in high school science and university courses in agronomy, agricultural engineering, chemistry, English, biology, social science, and economics; (d) achievement in high school social studies and university courses in agronomy, animal science, chemistry, English, psychology, biology, social science, and economics; and (e) achievement in high school vocational agriculture and university courses in agronomy, animal science, agricultural engineering, chemistry, English, biology, and social science.

15. GLEASON, WILLIAM E. Functions of Industry Approach to Curriculum for Vocational Education. Thesis, Ph.D., 1967, Michigan State University, 155 pp. Library, Michigan State University, East Lansing.

Purpose. To develop an approach utilizing the functions of an industry to discern content appropriate to curriculum development for educational programs preparing workers for an industry.

Method. The retail farm machinery industry of Michigan was selected as the non-farm industry for study. The first phase of the study consisted of an analysis, utilizing experts of the industry and of education, to identify and clarify the structure and purposes of the industry and the functions fulfilled by the industry. The management and service functions were selected for further study. A taxonomy of the technical and personal-social activities performed and the competencies required to perform the activities was developed in consultation with experts of industry and education. The activities and competencies identified were grouped by relatedness to typical curricular areas. The second phase of the study involved refining and verifying the activities and competencies identified to determine validity and appropriateness for curriculum development. A jury of experts rated the items according to a four point scale of desirability to establish an index of importance score for each item. The jury of experts was composed of three sub-juries: (1) managers of selected retail farm machinery business, (2) management personnel from sales and service positions at the wholesale level of the industry, and (3) educators engaged in researching, designing, or implementing educational programs preparing workers for the industry. All contacts with the experts from industry and education were on the basis of individual conferences and interviews.

Findings. The study revealed four functions common to retail farm machinery businesses in Michigan: (1) selling, (2) services, (3) management, and (4) records and accounts.

Seventy-five activities were identifed for the management function and 76 for the service function. Thirty-five competencies were suggested as essential to the management function and 31 for the service function. The activities and competencies identified were grouped under ten curriculum areas: (1) records, (2) finance, (3) inventory control, (4) personnel evaluation and supervision, (5) safety, (6) attitudes and habits, (7) advertising, merchandising, and public relations, (8) sales, (9) mechanical service, and (10) agriculture. Activities and competencies for each function were identified for the first eight areas. Mechanical service was unique to the service function. There were no activities classified as agricultural identified for either function although a considerable number of agricultural competencies were found to be desirable for performance of each function. A high degree of agreement for activities and competencies was revealed by the responses from the jury of experts. Activities and competencies requiring abilities in the personal-social areas tended to be rated equal in importance with technical abilities when considering the range of requirements for workers in the industry.

The "functions of industry" approach was found to be a workable concept for analysis of an industry to discern content appropriate for educational programs. The curricular areas contributing to educational programs preparing persons for a function were suggested. There was a difference in the level of understanding required in specific areas for different functions. There were curriculum areas common to both functions. The social and technical involvement required by a function tended to be equally important.

16. HAMILTON, JAMES B. Youth with Special Needs in Non-Metropolitan Ohio High Schools. Dissertation, Ph.D., 1967, The Ohio State University, 239 pp. Library, The Ohio State University, Columbus.

Purpose. To determine characteristics of students and to identify important aspects of vocational education programs essential to the serving of youth with special needs in non-metropolitan Ohio high schools.

Method. Ninth grade youth with special needs were identified and categorized as to major type of disadvantage by high school principals and guidance counselors in 133 high schools in response to a mail questionnaire sent to a random sample of 150 non-metropolitan Ohio high schools. Analysis of variance was employed to determine significant differences between percentages of students identified as disadvantaged, both by sex and by school size category. Relationships among categories of disadvantaged youth were established through the product moment coefficient of correlation. Characteristics of youth with special needs were determined from data gathered from students and school records concerning 154 ninth grade youth with special needs compared with 169 other ninth grade students in eight randomly selected non-metropolitan high schools. Thirty characteristics were studied using "t" tests and chi square to establish significant differences between the groups. The importance of serving youth with special needs, of selected approaches to serving these students, and of previously identified unique characteristics for occupational education programs for the disadvantaged were determined by responses of 108 high school principals to a mail questionnaire sent to the 133 schools.

Findings. One of seven ninth grade students in non-metropolitan Ohio high schools was considered to have special educational needs. Boys identified as disadvantaged outnumbered girls by a ratio of three to two. The greatest numbers of students were considered to be intellectually handicapped, educationally deprived, economically deprived and socially disadvantaged. Very few students were considered to be ethnically disadvantaged or physically handicapped.

Youth with special needs were found to differ in characteristics related to home and family background such as: larger families, more broken homes, and lower educational and occupational levels of parents. They were also found to differ in educational characteristics such as: lower grades, higher rates of absence, lower reading levels, lower intelligence test scores, and lower educational and occupational aspirations. No significant differences were found in terms of race, place of origin, or whether or not the mother worked outside the home.

Principals recognized an unmet responsibility of the school toward serving youth with special needs. There was lack of agreement among principals, however, as to the best approach to the problem. Principals considered 23 of 30 previously identified unique characteristics for occupational education programs for the disadvantaged to be of much importance in the conduct of such programs.

17. HANNEMANN, JAMES WILLIAM. The Availability and Use of Instructional Media and Materials in Departments of Vocational Agriculture in the United States. Independent Study, 1967, Michigan State University, 25 pp. Library, Agricultural Education, Michigan State University, East Lansing.

Purpose. To determine answers to the following questions: (1) the type of instructional media to which teachers of agriculture have access, (2) teachers' use of single-frame filmstrips and 2 x 2 slides, (3) teachers' use of overhead transparencies, (4) teachers' use of models, specimens, and demonstration kits, and (5) sources of instructional materials used by teachers.

Method. The population consisted of federally reimbursed departments of vocational agriculture in the continental United States. A 4 per cent unrestricted random sampling was selected from 47 of the 49 states. A closed-end response questionnaire was used to collect information from the sample of 357 departments of vocational agriculture. Usable questionnaires were received from 94 per cent of the departments surveyed.

Findings. The 16mm motion picture projector is the predominate item of instructional media available to teachers of agriculture. The manual 2 x 2-inch slide projector and filmstrip projector head the list of items to which the teacher of agriculture has complete and unlimited access. A recent innovation, the 8mm film-loop projector, is being used by 10 per cent of the teachers of agriculture. Another relatively new item, the overhead projector, is becoming a common item in many departments of vocational agriculture as nearly one-fifth of the agricultural teachers have unlimited access to such projectors and over one-half of the agricultural teachers have shared access to an overhead projector.

There is a solid demand for 2 x 2-inch slides and filmstrips in nearly all the content areas. The same is true for overhead transparencies. There is a definite demand for student demonstration kits and preserved specimens.

Over one-half of the agricultural teachers indicated they used 2 x 2-inch slides and/or filmstrips in teaching livestock selection and judging. Over three-fourths of the agricultural teachers indicated they would use, if available, filmstrips and/or 2 x 2-inch slides or overhead transparencies in the areas of agricultural occupations, agricultural services and sales, and agricultural marketing.

Fifty-three per cent of vocational agriculture teachers purchased instructional media and/or materials from their State Department of Education and fifty-six per cent from their University Department of Agricultural Education during the past two years.

18. HARLESS, CARROLL DALE. Farming Opportunities in the NESCO Community School District. Thesis, M.S., 1966, Iowa State University of Science and Technology, 62 pp. Library, Iowa State University of Science and Technology, Ames.

Purpose. To estimate the farming opportunities in the NESCO Community School District, to determine the number of farm youth in the community, and to identify the factors affecting farmer replacement opportunities in the community.

Method. The procedure used in obtaining the data included personally interviewing each of the 188 farm operators in the NESCO Community School District.

Findings. The mean age of the farm operators in the district was 45 years. This was 3.5 years below the average age of Story County farmers. The average total acreage per farm was 266 acres. Forty-seven per cent of the farms were 161 to 320 acres; 30 and 22 per cent, respectively, were 160 or less and 320 or more acres. Forty-nine per cent of the farmers in the study owned all or part of the land which they farmed. Of the 51 per cent of the farmers who did not own any land, 87 were renters, 4 were in partnerships, 2 had renter-partnership combinations, and 2 were hired operators. The average operator had been farming about 14 years.

An average of 5 farmers anticipated becoming inactive in farming per year from 1965 to 1989. Thus there will be 5 farms available each year for consolidation with other farms or will provide opportunities for beginning farmers.

Fifty-three per cent of the operators in this study farmed without any hired help as compared to 30 per cent of the operators in Story County who farmed without any hired help. It appeared that there was a limited opportunity for full-time hired hands. Seventy-six per cent of the farm operators in this study were not employed off the farm. A greater percentage of farmers 40 years of age and younger were employed off the farm than those over 40 years of age. Employment off the farm may be needed by beginning farmers to receive adequate incomes while increasing the size of their farming operations.

Eleven farms will become available during the next 10-year period if all the farmers who are now 65 years of age or older retire from farming. Also, 14 farms will become available if 50 per cent of the farm operators who are now 55 to 64 years of age quit farming during the next 10-year period. Thirty farms would become available during the next 10-year period assuming that each year 2 per cent of the farm operators who are now less than 55 years of age take up another occupation. Thus 55 farms would become available during the next 10-year period. This would be an average of 5.5 farms per year which would provide opportunities for beginning farmers or for farm consolidation.

Assuming a 3.1 per cent decrease in farms during the next 5 years in the NESCO Community School District, there would be 5.8 fewer farms in 1970. This would be a decrease of about 1.2 farms per year. Subtracting this decrease in number of farms from the 5.5 farms which would be expected to become available each year, there would be 4.3 farms each year during the next 5 years which would provide opportunities for beginning farmers.

Data revealed that there would be 10 farm boys graduating each year from the NESCO Community School during the next 10 years. Thus, if 40 per cent of the farm boys graduating each year want to farm, there would be a shortage of 0.3 replacement each year.

19. HEMP, PAUL E. University of Illinois Summer Institute for Teachers of Ornamental Horticulture in the Midwestern Section of the United States. Staff study, 1967, University of Illinois, 310 pp. Department of Vocational and Technical Education, University of Illinois, Urbana.

Purpose. To conduct a summer institute in ornamental horticulture for 30 teachers of agriculture, to develop and field test ornamental horticulture curriculum materials, and to evaluate the institute program and the curriculum materials.

Method. A four-week summer institute was conducted at the University of Illinois during the summer of 1966 for teachers of agriculture from Illinois, Indiana, Missouri, Kentucky, Michigan, and Kansas. Seven source units covering major areas of study in ornamental horticulture were developed by institute enrollees and the research staff. Fifty laboratory exercises and a student record book and planning guide were developed by the research staff and field tested by teachers who had attended the institute. Evaluation of the institute and the curriculum materials was accomplished by the use of evaluation forms, staff visits to schools where the institute enrollees were employed, and a follow-up evaluation conference held at the University of Illinois in June, 1967.

Findings. This project was conducted as a training and program development project. The major outcomes of the project were 50 laboratory exercises for student use, seven source units for teacher use, and a planning guide and record book for students.

The summer institute program had a definite impact on the development and improvement of vocational ornamental horticulture programs in the secondary and postsecondary schools where institute enrollees were employed. Teachers who attended the institute were well satisfied with the instruction provided but some individuals felt that work experience in horticultural firms would also be a desirable method of retraining teachers.

Implementation of the materials taught at the institute was visible in most of the schools represented. Thirteen of the 30 schools offered separate ornamental horticulture classes in 1966-67. Twenty-six of the 30 schools taught ornamental horticulture as an integral part of their regular vocational agriculture program. Some of the major obstacles to program development which teachers reported were lack of facilities, lack of time, lack of support from school administration, and lack of student interest. In some schools the development of separate ornamental horticulture classes did not occur until the following school year (1967-68).

20. HICKMAN, ROY DON. Farm Business Record and Analysis Systems of Iowa Farm Operators. Thesis, Ph.D., 1967, Iowa State University of Science and Technology, 203 pp. Library, Iowa State University of Science and Technology, Ames.

Purpose. To determine the procedures and practices in farm business record keeping and analysis used by Iowa farm operators, to determine the degree to which farm business records were kept and used for analysis purposes, and to investigate the relationship between certain farm operator and farm business characteristics and the degree to which farm business records were kept and used for analysis purposes.

Method. The population included Iowa farm operators, residing in the open country area of the state, whose farm operations had gross sales of agricultural products totaling $2,500 or more in 1965. A stratified, multistage cluster area sample was drawn and data collected by personal interview. Field enumeration produced 322 completed questionnaires. The schedule obtained information regarding the type of records kept and analysis made by respondents in 1965 on their overall farm business and the enterprises of crops, beef cattle, swine and dairy. The degree to which an operator kept and used records was measured by a record keeping and analysis index score computed from weights assigned each record item and analysis measure by a panel of farm management specialists.

Findings. About one-third of the farm operators had received some type of formal agricultural education. Approximately 15 per cent had received informal instruction in record keeping and analysis such as adult farmer groups, short courses, or extension record groups of farm business associations. Over one-half of the farmers had used a record book prepared especially for farm accounting. Almost 15 per cent did not use a record book of any type. The wives of over 60 per cent of the married male operators had some part in making record book entries. Almost 96 per cent of the respondents had engaged professional services to prepare their 1965 income tax returns.

An investigation of the proportions of farmers who completed individual record and analysis items revealed that few operators had kept detailed records or made an intensive analysis of their farm businesses. Record items kept by smaller proportions of operators were labor expenses, complete feed records, and family living expenses. Analysis measures involving returns on feed fed to livestock, total expenses per enterprise unit, and rate of gain measures were computed by smaller percentages of farmers.

Regression analysis results suggested that farmers having the better record keeping and analysis systems generally possess the following characteristics: have received some type of instruction in farm management, accounting and record analysis; have less farming experience; have larger farming operations; earn a greater proportion of their net incomes from off-farm sources; and have net worths in the range of $50,000 to $74,999.

The findings imply that vigorous educational programs in farm management, record keeping, and business analysis are critically needed by both present and prospective farmers.

21. HOERNER, HARRY JOHN. Competencies in Electricity Needed by Iowa Farmers. Thesis, M.S., 1966, Iowa State University of Science and Technology, 102 pp. Library, Iowa State University of Science and Technology, Ames.

Purpose. To determine the electrical competencies needed by farmers as indicated by a panel of specialists in farm electricity and to determine the degree these competencies are needed and possessed as expressed by both a random sample of farmers and a selected group of outstanding farmers.

Method. A panel of 12 specialists in farm electricity was used in developing a questionnaire to submit to two sample groups of farmers, an outstanding group and an average group. The outstanding group of farmers was nominated by 47 managers of Rural Electric Cooperatives in Iowa; the average-farmer group was randomly selected from lists of a farm directory service company. A questionnaire presenting 44 farm electrical competencies and asking for personal and farm business information was sent to the farmers. Usable questionnaires were returned by 102 farmers in each group. The competencies were evaluated by farmers in terms of both degree of competence needed and degree of competence possessed by use of a 5-point scale.

Findings. Understandings rated highest by both groups were: (1) how pressure, time and limit switches, thermostat and humidistat controls, and magnetic relays operate in controlling mechanized feeding equipment, (2) install all electrical wiring and fixtures in a building such as a farrowing house or milking parlor, (3) determine correct pulley size for motor and equipment based upon motor speed and required equipment speed, and (4) install the wiring to a silo unloader or other large size piece of electrical equipment on the farm. In some cases, farmers indicated they possessed more competence than needed in individual competencies. Two of these were the ability to replace fuses and the ability to replace the attachment plug on the end of appliance cords.

Comparisons among groups indicated the following differences: (1) average farmers had a wider difference between competence needed and possessed scores than did selected farmers, (2) outstanding farmers operated considerably larger farms, (3) outstanding farmers used almost four times as many KWH of electricity in one month than the average farmers, and (4) outstanding farmers had twice as many electrical appliances on their farms than did the average farmers. Similarity among the two groups was indicated by: (1) the average number of years farmed, (2) educational levels attained and years of vocational agriculture completed, (3) the fact that neither group of farmers had been provided with much instruction in electricity.

All of the competencies studied were deemed necessary for effective use of farm electricity. The mean scores for 43 of the 44 competencies were 2.0 or above indicating some need for the competency. The mean score was 2.5 or above for 23 competencies with the outstanding farmer group and for 26 competencies with the **average** farmer group. Four correlations between seven selected control items were found significant at the one per cent level for outstanding farmers. Most highly significant were acres operated with number of electrical appliances found on farms and acres operated with number of animal units. Six significant correlations, four at the one per cent level and two at the five per cent level, were found between seven selected control items for average farmers. Most highly correlated were acres operated with number of selected electrical appliances found on farms, and KWH of electricity with number of electrical appliances found on the farm.

22. HORNER, J. T., CAREFOOT, JUDITH AND BUTERBAUGH, J. The Anatomy of Decision Making As It Related to Occupational and Educational Choices of Rural Youth. Staff study, 1967, University of Nebraska. Library, Department of Agricultural Education, University of Nebraska, Lincoln.

Purpose. To identify factors influencing the decision-making of rural youth.

Method. A review of current literature was conducted. Four main sections were identified: (1) sociological factors, (2) economic factors, (3) educational factors, and (4) psychological factors. Specific factors were identified in each section.

Findings. The findings indicate that American youth give much thought and attention to preparation for future adult roles. The attainment of an occupation will have an important influence on realization of other status goals, social rank, and the overall life satisfaction the individual will experience. The type of employment obtained is thought to be influenced by the motivation and direction provided by occupational aspirations, expectations, and interest of adolescents. These phenomena are crucial for the occupation attainment of rural youth, especially those who migrate into urban areas. Possible low level occupational aspirations explain to some extent the disadvantaged position of rural migrants in the urban occupational structure. The importance attributed to the status attainment is evidenced by the increasing amount of attention being currently given to the study of these phenomena.

23. HUNDLEY, JAMES LOWELL. The Functions of an Advisory Council for Vocational Agriculture. Master's report, 1967, Kansas State University. Library, Kansas State University, Manhattan.

Purpose. To determine the functions of the vocational agriculture advisory council.

Method. Questionnaires were distributed to teachers of agriculture during area teacher conferences. Each teacher was asked to express his feelings regarding the degree of participation by the council for a selected group of functions.

Findings. The areas receiving the highest ratings were those relating to community relations functions of the council. It was found that the advisory council had a responsibility in developing community understanding for the program of vocational agriculture. The second highest rated area pertained to advisory council and teacher relationships. The survey showed it was a function of the council to help guide and assist the teacher on special problems and to strengthen the security of a successful teacher. Functions of the advisory council in regard to public relations also were rated high. Teachers responded favorably to these functions: serving as a buffer between community and department regarding vocational agriculture programs and acquainting administrators with farm patrons through the participation in an open house.

24. JARRETT, VON H. Improving the Proficiency of Mechanical Activities Performed by Utah's Agriculturalists. Thesis, Ed.D., 1967, University of Missouri, 172 pp. Library, University of Missouri, Columbia.

Purpose. To determine the (1) mechanical activities performed by farmers, (2) whether the farmers should perform these activities, (3) areas where additional training would be desirable, (4) effect of full-time and part-time farming upon the types of mechanical activities performed, (5) size and type of farming operations, (6) tools farmers possessed, (7) machines farmers had to perform mechanical activities, and (8) changes that should be made in the training curriculum.

Method. Data were obtained by means of an information form. Fourteen counties were selected and one teacher was selected from each county. Each designated teacher requested his students to have their parents complete the survey form. A total of 934 forms were distributed with 819, or 88 per cent returned, of which 670 or 72 per cent were usable.

Findings. The following conclusions were drawn: (1) Thirty-three per cent of the farms were under 100 acres in size. (2) The returns indicated that instructors of vocational agriculture in Utah are teaching more students from part-time than from full-time farms. (3) Thirty-four per cent of the respondents classified themselves as general farmers. Fifty-six per cent lived on their farms. Only five per cent indicated that their annual sales and inventory exceeded $30,000. Slightly more than half of the farmers had vocational agriculture in high school. More than half of the farmers had shops on their farms. (4) Utah farmers perform many mechanical activities for which they are not properly trained. (5) Additional training is needed in all areas of mechanics with the greatest need in electrification, farm power and machinery, buildings and conveniences, shop skills, and soil and water management. (6) Increased emphasis should be placed on mechanical activities to serve the growing number of part-time farmers. (7) The most immediate changes needed are: (a) more teaching in the area of electricity; (b) increased emphasis on service and maintenance of farm trucks; (c) additional training regarding internal combustion engines; and (d) more emphasis on farm buildings and conveniences.

25. JAWORSKI, DONALD M. Concepts in Ornamental Horticulture. M.S. Seminar report, 1967, University of Wisconsin, 10 pp. Library, Department of Agricultural and Extension Education, University of Wisconsin, Madison.

Purpose. To define what is a concept and to identify a list of ornamental horticulture concepts for use at the high school level.

Method. A review was made of educational literature regarding concepts, horticultural research studies, and agricultural curriculum guides.

Findings. A concept is a group of associative facts organized by individual thinking which have functional value in understanding our environment and solving personal problems. Twenty-four concepts in ornamental horticulture were identified. These were classified as one key concept, thirteen specific concepts, and ten functional concepts.

26. JONES, GARY L. A Follow-up Study of the Male Graduates of the Peabody High School from 1951 to 1966. Master's report, 1967, Kansas State University. Library, Kansas State University, Manhattan.

Purpose. To obtain information about graduates pertaining to: (1) further education after graduation from high school; (2) number of years each male graduate had taken vocational agriculture; (3) percentage of graduates, taking one or more years of vocational agriculture, employed in farming or agri-related occupations; (4) estimated present salary; (5) extracurricular activities considered to have been most valuable to the graduate; and (6) courses taken in high school that had proven valuable or of little value after graduation.

Method. Questionnaires were mailed to 256 male graduates of Peabody High School. Questionnaires were returned by 121 of the graduates. Nine of the graduates returned the questionnaire unanswered. No addresses could be found for eighteen of the graduates.

Findings. Eighty-six of the one hundred twenty-one graduates (71 per cent) attended schools of higher learning. Three (2.3 per cent) of the graduates entered the armed forces and twenty-one (17 per cent) entered the world of work. Seventy-eight of the respondents entered a four-year college or university. Of these, sixteen did not complete their college work, twenty-seven are still working toward a degree, thirty-seven completed four years of college, and seven completed advanced degrees. Eighteen (15 per cent) of the one hundred twenty-one respondents completed one year of vocational agriculture, seven (6 per cent) completed two years, thirteen (11 per cent) three years, and thirty-seven (31 per cent) completed four years. Forty-nine (65 per cent) of the respondents who had taken one or more years of vocational agriculture were employed in either farming, agri-business, part-time farming or part-time agri-business. Twenty-five (20 per cent) of the graduates were earning less than $3,000 annually, twenty-nine (24 per cent) were earning between $3,000 and $3,900, forty-one (34 per cent) were earning from $5,000 to $7,500, and twenty-seven (22 per cent) were earning over $7,500. The average earnings were $5,600. Forty-five per cent of the students taking one or more years of vocational agriculture indicated this course had proven valuable since graduation, while ten per cent stated it had not proven valuable to them. Eighty-five per cent of the respondents indicated a benefit from all extra-class participation. Nine per cent stated no benefit. Thirty-eight per cent of the respondents indicated the FFA was the most valuable extra-class activity, with football receiving the next highest rating.

27. KAHLER, ALAN ARNOLD. Factors Related to the Occupations of Nebraska Farm Male High School Graduates. Dissertation, Ph.D., 1967, Iowa State University of Science and Technology. Library, Iowa State University of Science and Technology, Ames.

Purpose. To investigate the relationships of selected factors to the occupations of Nebraska farm male high school graduates during the time period of 1954 through 1958. The specific objectives of the study were to determine the relationship between the graduates' occupations and the geographical locations of their high schools, between the graduates' occupations and selected characteristics of their home environments, between the graduates' occupations and their educational backgrounds.

Method. Educational, geographical, environmental, and socio-economic data were obtained from the permanent records of 69 randomly selected Nebraska high schools and from 1,120 of their graduates. Data were collected by questionnaire. Ninety-three per cent of the questionnaires were returned. Chi-square and product-moment techniques were used to analyze data.

Findings. A frequency distribution of the graduates, grouped according to the classification of their occupations at the time the study was made, revealed that 37.7 per cent were farmers and farm managers, 14.9 per cent were engaged in off-farm agricultural occupations, 1.0 per cent were employed as farm laborers, and 46.4 per cent were engaged in non-agricultural occupations. Significant relationships were revealed between agricultural classification of graduates' occupations and semesters of vocational agriculture, value of vocational agriculture, extent of migration, size of home farm, occupational income of graduates, need for knowledge of agriculture, and Nebraska economic areas in which graduates had resided.

Migration of graduates was significantly related to census classification of graduates' occupations, Nebraska economic area of graduates' residence on the day of high school graduation, semesters of science and mathematics, occupational income, and the extent of participation in extra-curricular activities while attending high school. Significant relationships were revealed between graduates' occupational incomes and need for knowledge of agriculture, North-Hatt Occupational Prestige Scale value of graduates' occupations, graduates' job satisfaction score, participation in extra-curricular activities, father's education, number of siblings, quartile rank in graduating class, and enrollment in post-high school institutions.

Occupational income, high school activity participation, and quartile rank tended to be positively correlated with migration, graduates' North-Hatt Occupational Prestige Scale value, enrollment in post-high school institutions, and job satisfaction scores. Enrollment in post-high school institutions was positively correlated with education of father and with North-Hatt Occupational Prestige Scale value of graduates' occupations. Negative coefficients of correlation were observed between semesters of vocational agriculture and semesters of mathematics, semesters of vocational agriculture and semesters of science, need of knowledge of agriculture, and number of different positions of employment held by graduates since graduation from high school.

28. KELLY, WARREN G. An Evaluation of the Pre-Service Agricultural Education Curriculum at West Virginia University. Thesis, Ed.D., 1968, University of Missouri, 204 pp. Library, University of Missouri, Columbia.

Purpose. To evaluate the pre-service agricultural education curriculum at West Virginia University to determine how adequate it has been in developing competencies needed by teachers of vocational agriculture.

Method. A list of competencies was developed for the areas of: (1) general education, (2) professional education, (3) agricultural economics and farm management, (4) agronomic, (5) animal science, and (6) agricultural mechanics. A questionnaire with a rating scale designed to indicate the degree to which a teacher of agriculture possessed each competency was developed. Three groups of people were surveyed: (1) teachers who graduated from the University between January 1957 and August 1964; (2) principals of the high schools where the teachers taught their first year; and (3) state supervisors. Usable returns were received from fifty-eight teachers, thirty-three principals, and the five supervisors of vocational agriculture.

Findings. The following conclusions were drawn: (1) The teachers' and principals' responses indicated a strong association, except for five competency items, in the areas of general and professional education. (2) The teachers were significantly inadequate in one general education competency, as indicated by the principals. (3) The supervisors indicated the teachers were inadequate in thirteen professional education competencies, while teachers felt inadequate in only two. (4) The principals and supervisors indicated the teachers were significantly adequate in the broad technical agriculture categories. (5) The teachers indicated they were adequate or more than adequate in all but three of the competencies in agricultural economics and farm management. (6) The teachers indicated they were adequate or more than adequate in all but one of the agronomic competencies listed. (7) The teachers indicated adequacy for all competencies of animal science. (8) The teachers thought themselves to possess adequate or more than adequate competency in all but three items in agricultural mechanics. (9) The teachers indicated that sixteen of the fifty-five courses making up the undergraduate curriculum were of no significant help to them during their first year of teaching.

29. KERWOOD, ROBERT VAUGHN. Self-Initiated Evaluation of State Teacher Education Programs in Vocational Education. Dissertation, Ph.D., 1967, The Ohio State University. Library, The Ohio State University, Columbus.

Purpose. To develop an instrument to guide the self-initiated evaluation of a state program of vocational teacher education. Three specific objectives were identified and accomplished: (1) to develop criteria and indicators for evaluating the state's total program of vocational teacher education, (2) to validate an instrument, including criteria and indicators, for evaluating a state's total program of vocational teacher education, (3) to analyze, by occupational service area and position, the ratings of the criteria and indicators given by a sample of vocational education personnel.

Method. The study was based on 316 questionnaires received from a stratified random sample of state directors, head state supervisors, and head teacher educators of vocational education throughout the United States and territories. The data were analyzed by occupational service area and position utilizing the one-way analysis of variance technique.

Findings. Nine criterion statements with seventy-six attendance indicators were validated as a result of the study. The concepts presented in the criterion statements and indicators were within the following dimensions of the state program of vocational teacher education: (1) planning, (2) coordination among occupational service areas, (3) coordination with the total state program of vocational education, (4) supplying the demand for vocational personnel, (5) occupational competence, (6) accessibility of vocational teacher education, (7) research, (8) instructional materials, and (9) systematic evaluation.

State directors, head state supervisors, and head teacher educators of vocational education, when studied according to staff position held, were in agreement with their ratings of seven of the nine criterion statements. The criteria which were rated significantly different were in the areas of research and instructional materials. The groups were also in agreement in their ratings of 70 of the 76 indicators.

Head state supervisors of vocational education, when studied by occupational area, were in agreement with their ratings of 7 of the 9 criterion statements. Those criteria rated significantly different were in the areas of research and systematic evaluation. The group was also in agreement with 69 of the 76 indicators.

Head teacher educators of vocational education, when studied by occupational area, were in agreement with their ratings of 8 of the 9 criterion statements. The criterion statement which was rated significantly different was in the area of coordination with the total state program of vocational teacher education.

30. KORDICK, WAYNE A. A Study of Competencies in Farm Machinery Program Planning Needed by Farmers. Thesis, M.S., 1967, Iowa State University of Science and Technology, 111 pp. Library, Iowa State University of Science and Technology, Ames.

Purpose. To determine the competencies in farm machinery program planning needed by farmers, to determine the competencies in farm machinery program planning possessed by the average farmer and by the superior farmer, and to determine those competencies in farm machinery program planning that should be taught by vocational agriculture instructors.

Method. A questionnaire was mailed to farmers in a nine-county area of Southwest Iowa. The sample consisted of two groups: a list of selected, superior farmers submitted by the vocational agriculture instructors and county extension directors of the area sampled, and a random sample of farmers taken from the compiled list of county farm directories. A panel of 14 consultants developed the list of 51 competencies needed in farm machinery program planning.

Findings. Mean scores for degree of competence needed of 3.0 or higher (much competence needed) were indicated by both groups of farmers for those items pertaining to the understanding of finance charges and how they affect fixed cost of ownership, investment credit and how it can affect cost of ownership, annual use and how it affects cost of ownership, and how soil type and topography of land may affect farm machinery program planning. Items relating to abilities needed with scores of 3.0 or higher by both groups were: to determine machine capacity per hour or day; to compare cost of a used machine with a new machine; to purchase a machine that can be used on more than one crop or one job; to determine skill as an operator of a machine; to determine capital limitations as related to machinery planning; to evaluate possibilities for group ownership of some seasonal equipment with neighbors or relatives; to buy a good used machine to save on interest and depreciation costs; to determine probable machine changes in the next five years; to determine whether investment in machinery will increase operating efficiency by making better use of land and labor; to determine whether you will be able to produce as good or better products than you could without investing in additional machinery; and to be prepared for maximum effort during weather breaks in unusual years. In the majority of cases, respondents indicated that they possessed a lower degree of competence than was needed for adequate farm machinery program planning.

31. KRUSKOP, LEROY LAWRENCE. Competencies in Farm Management Needed by Vocational Agriculture Instructors. Thesis, M.S., 1966, Iowa State University of Science and Technology, 131 pp. Library, Iowa State University of Science and Technology, Ames.

Purpose. To determine the farm management competencies needed by vocational agriculture instructors, to determine the competencies in farm management possessed by teachers, and to determine where teachers acquired their competencies in farm management.

Method. A committee of vocational agriculture instructors and Iowa State University specialists prepared the list of farm management competencies used in this study. The questionnaire was mailed to 225 Iowa vocational agriculture instructors with one or more years of teaching experience. Questionnaires were returned by 69 per cent of the instructors. The instructors who returned questionnaires were classified according to teacher effectiveness into four groups (A, B, C, and D) by an evaluation panel of the Iowa Vocational Agriculture Teachers Association. The instructors returning the questionnaires evaluated the degree each competency was needed in teaching farm management. They also evaluated the degree each competency was possessed and indicated whether the competency was acquired on the farm, in vocational agriculture, in college, or on the job.

Findings. An understanding of farm record keeping and farm business analysis, the ability to analyze and interpret records, an understanding of the use of credit, and the ability to keep accurate and relevant records were evaluated as the four most needed competencies by group A. The same four competencies were also rated as most needed by group D. The least needed competencies indicated by group A were understandings of the concept of marginal analysis, the concept of equal-marginal returns (opportunity costs), the concept of discounting future income, and the concept of factor-factor and product-product substitution. For group D the four least needed competencies were understanding of the concepts of marginal analysis, value of and place of farm organizations, factor-factor and product-product substitution, and discounting future income. There was a high correlation between the ratings given by instructors in groups A and D. However, group D tended to indicate a higher degree of competence needed.

The instructors in group A rated the ability to keep accurate and relevant records as the most possessed competency. Other high ranking possessed competencies were: understanding the principles of selecting the livestock program, farm record keeping and farm business analysis, and analyzing and interpreting records. Group D rated three of the same four competencies as most possessed. The four least possessed competencies for group A were: understanding agricultural resource and income problems, concept of marginal analysis, concept of discounting future income, and the concept of factor-factor and product-product substitution. Group D ranked the competencies least possessed similar to group A.

The Spearman rank order coefficient of correlation was used to analyze the mean competency needed and possessed scores. A correlation of .93 was obtained for mean competency needed scores between groups A and D indicating a strong tendency of the two groups of instructors to rate the farm management competencies needed very similarly. For the possessed competencies, a rank order coefficient of correlation of .93 was found also.

32. LODHI, TANWEER AHMAD. Developing a Pre-Service Education Program for Agriculture Teachers at West Pakistan Agricultural University, Lyallpur (Pakistan). Dissertation, Ph.D., 1966, The Ohio State University, 164 pp. Library, The Ohio State University, Columbus.

Purpose. To develop a program of pre-service education for prospective agriculture teachers at West Pakistan Agricultural University, Lyallpur.

Method. Programs in ten Departments of Agricultural Education in the United States were studied to provide ideas and insights concerning teacher education. A list of sixteen guiding statements and the recommended program were submitted to five members of the jury for their reaction and suggestions. The study was limited primarily to selection and recruitment, curricula, and professional laboratory experiences. Brief attention was given to placement, follow-up, and in-service education.

Findings. It was concluded that there was need for a systematic program of selection including grade point average, physical fitness, experience on a farm and desirable personality factors. In order to attract suitable candidates in adequate number, a systematic recruitment program both at the University level as well as at the department level was needed.

On examination of the outlines of courses required at Lyallpur, it was found that all the areas traditionally contributing to the objectives of general education were not represented in the general education program even though the time devoted to general education compared favorably to the practices followed in the United States. It was suggested that the time devoted to general education at Lyallpur be continued but that the general education area should include courses in physical sciences, biological sciences, social sciences, and humanities.

It was found that 52 per cent of the five year program was devoted to the area of specialization at Lyallpur which was about 15 per cent more than average requirements in the ten selected institutions in the United States. On the other hand, it was found that professional education as well as electives constituted only 8 per cent of the program at Lyallpur which was 18 per cent less than the average requirements in the ten selected institutions. Therefore, it was suggested that more time be given to professional education and electives. The suggested division was general education 40 per cent, area of specialization 45 per cent, and professional area and electives 15 per cent.

The student teaching in a typical community school should be for about ten weeks in addition to summer experiences. It should include a study of the community and some field experience in Extension.

33. LOOMIS, HAROLD I. Analogies Developed from Methods of Teaching Reproduction. Master's report, 1967, Kansas State University. Library, Kansas State University, Manhattan.

Purpose. This study developed around the assumption that problems could arise from vocational agriculture students' making false analogies between livestock and human reproduction. The central question of the study was whether some possible false analogies could be identified and whether the inclusion of sex education material would keep false analogies between livestock and humans from developing.

Method. A questionnaire was given to both a control group and an experimental group. Both groups were composed of nine sophomore boys studying vocational agriculture. The control group was located at Frankfort High School. The experimental group studied at Silver Lake High School. The control group studied only livestock reproduction while the experimental group studied both livestock and human reproduction. At the end of the study, both groups were again given the same questionnaire and a comparison of their responses was made.

Findings. Problem areas were identified relating directly to the teaching of livestock production as follows: (1) the students of both groups changed their ideas about the location of the reproductive canal to a false conception of its location, and (2) the students of the experimental group did not change their ideas about the misconception that human females have estrus symptoms like those of livestock to the correct conception as the control group was able to do. The findings also identified two areas which could be corrected if reproduction was explained in a way that would eliminate the students drawing misconceptions in these areas: (1) the students of both groups failed to realize that ova have to be present before menstruation will occur; therefore, a female could become pregnant before her first menstruation after giving birth to a child; and (2) the vagina contains small, sharp hook-like or teeth-like projections to which the experimental group responded incorrectly at the beginning of the study but not at the end, and the control group responded correctly at the beginning but did not at the end. Four assumptions were drawn by the investigator from the study.

34. MATTESON, GERALD R. AND THOMPSON, MARVIN D. The Instructional Material Needs of the High School Vocational Agriculture Teacher in Wisconsin. Staff study, 1967, Wisconsin State University-River Falls, 26 pp. Library, Department of Agricultural Education, Wisconsin State University, River Falls.

Purpose. To determine the instructional material needs of high school vocational agricultural instructors in Wisconsin.

Method. A questionnaire was sent to the 275 vocational agricultural instructors in Wisconsin. Responses were obtained from 94 per cent of the instructors. Instructional materials were classified into the following groups: (1) lesson plans, (2) transparencies, (3) charts and graphs, (4) workbooks and mimeographed material, and (5) models, specimens, and samples. Each respondent was asked to indicate his need for the above mentioned instructional materials in selected subject matter areas. The possible responses in each area were: (1) strong need, (2) moderate need, and (3) no need.

Findings. A majority of the 258 instructors responding had changed their high school vocational agriculture curriculum in the past three years. Careers in agriculture, farm power, agricultural economics, horticulture and landscaping, farm machinery and farm management were most frequently listed as the subject areas in which the instructor had the greatest need for instructional materials. Woodlot management, FFA, cooperatives, sheep, and poultry were most frequently mentioned as the five subject areas in which the instructor had the least need for the instructional materials. Ninety-four per cent of the instructors responding stated that an Instructional Materials Center would be of value to them and that they would also be willing to attend workshops for the purpose of discussion, demonstrating, and dissemination of new instructional materials.

35. McGHEE, OLIVER CLAUDE. Professional and Technical Needs of Teachers of Vocational Agriculture in West Virginia. Dissertation, Ph.D., 1967, The Ohio State University. Library, The Ohio State University, Columbus.

Purpose. To identify the professional and technical needs of teachers of vocational agriculture as they relate to a complete program of vocational agriculture in West Virginia.

Method. A questionnaire that contained sections dealing with professional and technical skills thought to be important to the success of the vocational agriculture program in West Virginia was used. The respondents were teachers of vocational agriculture, state staff in teacher education and supervision, and principals in schools having vocational agriculture departments. The principals rated selected professional skills of their teachers of vocational agriculture on the basis of importance of the skills and the teacher's competency for performing it. Teachers of vocational agriculture rated professional and technical skills according to importance and their competency for performing the skill. The state staff indicated the per cent of teachers needing improvement in selected professional skills. A 90 per cent return was received from the high school principals, a 97 per cent return from teachers of vocational agriculture, and a 100 per cent response from the state staff.

Findings. (1) Both off-campus and on-campus in-service education should be provided to meet the needs of teachers, including on-the-job supervision, conferences, seminars, short courses, workshops and regular program courses and workshops that are of a caliber to meet Graduate School standards. (2) Professional areas of performance rated above average in importance to the program of vocational agriculture were: instructional activities, supervised work experience, instructional materials, organization and planning, Future Farmers of America, off-farm agricultural occupations, relationship to school, young and adult farmer programs, and public relations. (3) Technical areas of performance rated above average in importance to the program of vocational agriculture were: agronomy, animal husbandry, soil conservation, entomology, dairy husbandry, agricultural economics, agricultural mechanics, plant pathology, horticulture, economic development, landscape architecture, poultry husbandry, tobacco production, forestry, civil defense, and recreation. (4) Vocational agriculture teachers did identify their technical needs to the degree that priority listings were made that might prove to be beneficial to an in-service education program. (5) The greatest needs for instructional assistance are in performance areas of off-farm agricultural occupations, using advisory committees, young and adult farmer work, making proper use of bulletin boards, occupational experience programs, public relations, rural sociology, recreation, civil defense, forestry, tobacco production, poultry husbandry, landscape architecture, economic development, horticulture, plant pathology, and agricultural mechanics. (6) Principals, generally, gave those selected areas associated with the vocational agriculture program a complimentary rating. (7) The identified professional and technical needs provide a basis to develop both the pre-service and in-service program of education for teachers of vocational agriculture. (8) The high competency ratings by the principals indicate that teachers of vocational agriculture are quite well prepared for their work, even though there is need for improvement.

36. NELSON, CURTIS LEROY. A Study of the Need for Obtaining Basic Agricultural Skills Used by Agriculture Teachers in the Effective Performance of Their Duties. Thesis, M.S., 1966, University of Minnesota. Library, University of Minnesota, Minneapolis.

Purpose. (1) To develop a list of technical skills required for effective teaching; (2) to determine the importance teachers place upon knowing how to perform various skills in the teaching program; (3) to determine where teachers obtained their training of the skills possessed and used; (4) to determine what degree of skill teachers possess; (5) to determine the importance Minnesota farmers place on the value of knowing how to perform these skills; and (6) to determine how frequently these skills are used by Minnesota farmers.

Method. A survey including a list of skills compiled from previous studies and from suggestions from personnel in each department of the College of Agriculture, University of Minnesota, was sent to 80 Minnesota vocational agriculture instructors, 160 Minnesota farmers, 80 agricultural education majors, and personnel in seven different departments of the College of Agriculture.

Findings. To perform effectively their duties as farm operators, 76 per cent of the farmers stated a knowledge of the entire group of listed skills was important since 68 per cent of the skills listed were used in their farm operations. In the replies received, 100 per cent of the teachers advised they would be interested in participating in a training program to upgrade their knowledge of these skills should such a program be offered. They indicated a desire to have a one-week session during the summer in area schools or at the district level. Teachers felt, in some areas, they were inadequately trained to perform frequently the various skills. This inadequacy ranged from 10 per cent in the swine area to a high of 48 per cent in horticultural skills. In ranking the importance of the performance of the various skills, teachers' and farmers' ratings were parallel in many instances. Frequently teachers as well as farmers rated skills they had a working knowledge of as important, whereas less emphasis was placed on skills with which they were unfamiliar or untrained to perform.

37. NELSON, TRAVIS N. A Study of Farm Machinery Instruction in Minnesota Vocational Agriculture Departments. Thesis, M.A., 1967, University of Minnesota, 48 pp. Library, University of Minnesota, Minneapolis.

Purpose. To determine the effect of the following factors on the scope of the farm machinery instructional program for high school students and beginning and adult farmers: number of teachers in the department; size of the agricultural shop; length of the agricultural mechanics class period; and the inventory of specific tools and supplies. The relationship between the agricultural mechanics class period and the methods of instruction was analyzed. Instructors were asked their opinions concerning the training of their students for entry into farm machinery related jobs.

Method. Questionnaires were submitted to 150 vocational agriculture departments in Minnesota high schools. The data received were tabulated according to the following criteria: single and multiple teacher departments, large and small shops, ten common farm machines, and thirty selected tools and supplies considered essential for teaching the ten farm machines.

Findings. The number of teachers in a department influenced the scope of the farm machinery instruction. The multiple teacher departments taught 8 of the 10 machines to high school students more hours than the single teacher departments. The size of the agricultural mechanics shop influenced the scope of the high school farm machinery instructional program. There was instruction on the total machines in 71 per cent of the possible cases in shops having more than 2,000 square feet compared with 47.9 per cent in shops with less than 2,000 square feet of floor space. Agricultural shops of more than 2,000 square feet of floor space and the multiple teacher departments had the largest inventory of the thirty selected tools and supplies.

Schools having two-hour agricultural mechanics classes spent more time teaching each machine than did schools with one hour classes. Instructional methods used by teachers with one and two-hour class periods did not vary greatly. Teaching methods used for beginning and adult farmers differed from those used in teaching high school students. The most significant difference was noted in the reading assignments. Reading assignments were given by 11.8 per cent of the instructors to high school students. Most instructors did not consider the training offered in their school adequate for most farm machinery related jobs.

38. OTTMAN, LEONARD RAY. A Twenty Year Follow-Up of Vocational Agriculture Boys at Onaga Rural High School. Master's report, 1967, Kansas State University. Library, Kansas State University, Manhattan.

Purpose. To determine the present occupational status of the students of the Onaga Rural High School who had taken four years of vocational agriculture during the years 1944 to 1964.

Method. Questionnaires were mailed to 126 former vocational agriculture students of the Onaga Rural High School. Four of the former students were deceased and the addresses of six could not be found. Eight of the questionnaires were not returned. A total of 94 per cent of the questionnaires were returned.

Findings. Fifty-five per cent of the farm boys who married farm girls were still farming at the time of this report. Three per cent of the farm boys that married city girls were still farming. One-third of the farm boys felt that the program should be changed from that which had been taken when in high school. Twenty-six per cent of the city boys felt that it should be changed. The most frequently mentioned changes by both groups were: (1) keep program up to date; (2) teach more ag-related subjects; (3) have more shop work; (4) teach more farm chemicals; and (5) do more blueprint work. Returns disclosed that the most benefit derived from the vocational agriculture program had been in the following: (1) shop or farm mechanics; (2) livestock instruction; (3) record keeping; (4) the FFA; and (5) crops instruction. It was found that the boys farming at the time of the report had a higher total investment than those in the ag-related and non-agriculture fields. Forty-eight per cent of the ag-related fields and 69.2 per cent of the non-agriculture fields had no investment in their present jobs. The survey showed that the boys farming reached a higher income bracket than those of the ag-related and non-agriculture fields. This study revealed that boys with investments of over $1,000 at graduation were all farming at the time of this report. Boys with high investments at graduation time that did not start farming entered armed services, went to college, and attended trade schools.

39. PARKER, LEONARD CALVIN. Farm Income of Selected Former Vocational Agriculture Students in Northeast Kansas. Master's report, 1967, Kansas State University. Library, Kansas State University, Manhattan.

Purpose. To survey the relationship between training in high school vocational agriculture and financial returns from farming.

Method. One hundred twenty-five members of the Northeast Kansas Extension Farm Management Association were possible subjects for the study. The study was limited to full time, individual farm operators, not over sixty years old, with five years continuous records in the Farm Management Association. A mail questionnaire was used to survey the educational background of these farmers. There were 112 completed questionnaires returned. The source of financial data for the study was from the individual farm records maintained for analysis purposes by the Farm Management Association. Detailed examination of these records produced ninety-one records that were suitable for the study. The ninety-one farms were divided into two groups with twenty-eight farmers who had two or more years of vocational agriculture in high school and sixty-three farmers with less than two years of vocational agriculture in high school.

Findings. For the vocational agriculture group there was a range of $24,848 between the lowest average annual net farm income and the highest average annual net farm income for the five year period studied. This range was $23,057 for the non-vocational agriculture group. The vocational agriculture group exceeded the non-vocational agriculture group in gross income from livestock, total gross income, operator's return for labor and management, and annual increase in net worth. The non-vocational agriculture group exceeded the vocational agriculture group in gross income from crops and miscellaneous income, non-farm net income, and the number of crop acres per farm. In this study the vocational agriculture trained farmers had a $666 higher mean annual net farm income for the five year period reflected in their records than the non-vocational agriculture farmers.

40. PRIBE, DONALD W. A Study of the Job and Educational Experiences of the 1959 Vocational Agriculture Graduates from Selected North Dakota High Schools. Research paper, M.S., 1967, North Dakota State University. Library, Department of Agricultural Education, North Dakota State University, Fargo.

Purpose. To determine the job and educational experiences of vocational agriculture graduates for 1959 of selected North Dakota high schools.

Method. Schools from which the sample was obtained were limited to those schools which offered vocational agriculture during the 1955-56 school year and had offered vocational agriculture since that time. A list of 25 such schools was selected. A letter was mailed to the vocational agriculture instructors in the selected schools requesting the names and addresses of all graduates of that school in 1959 who had completed 3 or more years of vocational agriculture. The lists returned by the 21 instructors who replied contained 170 names with mailing addresses. A total of 120 of the 170 questionnaires were returned.

Findings. Immediately following graduation 51 (43 per cent) of the graduates were engaged in agricultural occupations. Forty-two of these were in production agriculture and nine in agricultural business jobs. Twelve (10 per cent) of the graduates were employed in non-agricultural jobs, 48 (40 per cent) were students, and nine (7.5 per cent) were serving in the armed forces. More than 80 per cent of those who had taken jobs were involved in agricultural occupations.

At the time the follow-up study was made, sixty-eight (57 per cent) of the graduates were engaged in agricultural occupations. Forty-three were in production agriculture, 17 in agri-business, and eight were professional agriculturists. Forty-four (37 per cent) were employed in non-agricultural jobs and eight (7 per cent) were serving in the armed forces. More than 60 per cent of the graduates who were employed and were not in the armed forces were in the field of agriculture.

Twenty (17 per cent) of the graduates had some college training in agriculture. One was working beyond the Master's degree, two had Master's degrees, five had baccalaureate degrees in agriculture, and five had one but less than two years of college education in agriculture. Two were working on or planning to work toward the Ph.D. degree in agriculture. Twenty (17 per cent) had done college work of a non-agricultural nature. Forty-four of the graduates had no formal training beyond high school.

Forty-eight (40 per cent) of the graduates had held only one type or grade of job since graduating from high school. Ninety-seven (81 per cent) of the graduates had held three or fewer different types and grades of jobs since graduating from high school.

Eighty of the 120 graduates were living in North Dakota. Sixty-one of these lived in the community in which they graduated from high school and 19 lived in other communities in the state. Thirty-two (27 per cent) of the graduates had left the state and 7 per cent were serving in the armed forces. More than 70 per cent of those who were employed and who were not in the armed forces were living in North Dakota.

41. RINGEN, WILLIS EUGENE. Occupational Patterns of Farm Boys Who Graduated from Waterville and Blue Rapids High Schools Between the Years 1951 and 1960. Master's report, 1967, Kansas State University. Library, Kansas State University, Manhattan.

Purpose. To survey the occupational patterns of farm boys who graduated from the Waterville and Blue Rapids High Schools between the years 1951 and 1960 and to determine factors influencing their occupational choices.

Method. Data were collected by both the interview and the questionnaire methods. Data were obtained from forty-seven of the fifty-four Waterville graduates and from twenty-five of the thirty Blue Rapids graduates.

Findings. Thirty-eight per cent of the Waterville High School graduates were farming and 27.7 per cent were engaged in other agricultural occupations. Sixteen per cent of the Blue Rapids High School's graduates were farming and none were in other agricultural occupations. The Waterville High School graduates had been in an average of 2.7 occupations per person and Blue Rapids High School graduates had been in an average of 2.2 occupations per person since graduation from high school. The Waterville High School graduates had been in each occupation an average of 3.5 years and had been engaged in their present occupation an average of 5.7 years. The Blue Rapids High School graduates had been in each occupation an average of 3.4 years and had been in their present occupation an average of 5.5 years. Farming had been an occupation of 64 per cent of the Waterville High School graduates at some time since high school graduation and had been an occupation of 44 per cent of the Blue Rapids High School graduates. On the average it took seven to eight years after high school graduation to become established in an occupation. Data indicated that through the years an average of one-half of the Waterville High School graduates were in agricultural occupations while at no time were more than one-third of the Blue Rapids High School graduates engaged in agricultural occupations. More Blue Rapids High School graduates went into some post-high school education than did Waterville High School graduates (48 per cent as compared to 38 per cent) and more Blue Rapids High School graduates earned college degrees (28 per cent as compared to 6 per cent) than did Waterville High School graduates. It was found that 30 per cent of all those included in the study were in the occupation they had planned to enter while in high school and 37 per cent had made no vocational plans while in high school. Of those farming, 77 per cent were in the occupation they had planned to enter while of those in non-agricultural occupations, 11 per cent were in the occupation they had planned to enter.

42. RIX, JOHN H. The Relationship of the Labor Income from the Supervised Farming Program to Establishment in Farming. Paper, M.A., 1966, University of Minnesota, 32 pp. Library, Department of Agricultural Education, University of Minnesota, St. Paul.

Purpose. To determine what effect the labor income from the supervised farming program while in high school had in developing the interests, desires and abilities of young men to begin farming in northwest Iowa.

Method. Seven schools were selected at random which had all of the records and information needed to complete this study. All data were recorded from the Iowa state reports in the schools and from a short survey mailed to each of the former students in the seven schools who had completed eight semesters of vocational agriculture between the years 1947 and 1954.

Findings. The hypothesis tested was that there is a relationship between the level of income of the student from his supervised farming program and establishment in farming. Analysis using the point biserial correlation indicated a positive correlation between net income from the supervised farming program and establishment in farming. The investigator concluded that the supervised farming program plays an important part in establishing young men in the occupation of farming.

43. ROLLOFF, JOHN AUGUST. The Development of a Model Design to Assess Instruction in Farm Management in Terms of Economic Returns and the Understanding of Economic Principles. Dissertation, Ph.D., 1966, The Ohio State University, 155 pp. Library, The Ohio State University, Columbus.

Purpose. To develop and test a model for determining the influence of the farm business analysis phase of vocational agriculture instruction in farm management upon farm operator understanding of economic principles and factors indicative of economic efficiency.

Method. Tasks in the development of the model were: (1) the identification of "potent" variables which would indicate changes in the understanding of farm management principles possessed by a farm operator and in the income of the farm business; (2) the identification of the variables for instruction program inputs that are normally computed for reports by vocational agriculture instructors and readily assigned a monetary value per unit; (3) the development of techniques for removing cost or price fluctuations affecting measures used to identify change in farm income; (4) the development of a rationale for assigning a monetary cost per input unit of instruction; (5) the determination of a method of sampling the population of farm operators enrolled for instruction; (6) the delineation of procedures for collecting data; (7) the selection of suitable statistical techniques for the assessment of change within and between variables; and (8) the determination of ratios between the input costs of instruction and the economic changes accruing to farm operators enrolled for instruction. The test procedure was to determine for 27 farm operators participating in farm management instruction programs in five Ohio vocational agriculture departments: (1) the relative change in understanding of profit maximizing economic principles indicated by change in test scores; (2) the change in farm income indicated by selected economic efficiency factors; (3) the association between understanding of principles and the economic efficiency of farm operators; (4) the ratio between input costs of instruction and economic returns expressed as net farm income.

Findings. The pilot trial indicated that farm operators who had received instruction in farm business analysis demonstrated: (1) an improved mean change in test scores on the understanding of profit maximizing economic principles; (2) increased volume and economic efficiency in the farm business; (3) a positive association between the changes accruing to farm operators in their understanding of profit maximizing economic principles and the changes in their economic efficiency; and (4) a $53.16 increase in net farm income for each $1.00 expended on instruction.

Conclusions relative to refinement of the model procedure were projected as a means of advancing inquiry into the micro-economic assessment of investments in agricultural education.

44. SAKSA, GEORGE WALTER. The Use of Radio as a Teaching Method. Colloquium paper, M.A., 1966, University of Minnesota. Library, Department of Agricultural Education, University of Minnesota, St. Paul.

Purpose. To determine if a radio program is effective in causing listeners to obtain additional information from the County Extension Office and to determine the kind of audience so that the program content would be designed for the needs of that audience.

Method. A telephone survey was made using randomly selected residential phone numbers from the Grand Rapids, Minnesota, telephone directory. Seven per cent of the homes having telephones were called. The survey was conducted on three consecutive days in June 1966. The phone calls were made within one and one-half hours after each daily noon hour broadcast. The callers used a questionnaire designed to get the needed information in a minimum amount of time.

Findings. The radio program seemed to stimulate listeners to seek additional information by calling or visiting the extension office, obtaining a bulletin, or attending extension sponsored meetings. Sixty-four per cent of the listeners had made some contact with the extension office, while only 16.5 per cent of the non-listeners had made contact with the Extension Service.

The radio audience was found to be urban-oriented. Ninety per cent of the audience were women. The listeners are regular listeners with 77.7 per cent of the listeners hearing the broadcast all 5 days of the week.

The study has helped the staff to improve their programs by gearing the material to the type of audience. It has been decided to continue the broadcasts because there seems to be a correlation between listeners and their interest in seeking more information. The survey revealed that if a specific audience is sought, a careful study of the listening habits of the wanted audience must be made so that the selected audience would be reached.

45. SMAILES, WILLARD FRANKLIN. Influence of Farming Programs and Other Factors Associated with Pursuance of Farming by Graduates of Vocational Agriculture in Wayne County, 1953-1958. Thesis, M.S., 1965, The Ohio State University, 77 pp. Library, The Ohio State University, Columbus.

Purpose. To review the high school farming programs of graduates now farming and to determine the influence of these programs and other factors upon the graduates' occupational choice of farming.

Method. The vocational agriculture teachers in the eight departments in Wayne County schools provided the names and addresses of ninety-six graduates from 1953 through 1958 who were farming full-time or part-time in 1964. Forty-eight of these were used in the study. They were selected to represent, as nearly as possible, one-half of the graduates from each school for each year included in the study. Each graduate was interviewed personally at his home. A questionnaire was used to secure and record the data. Data collected included farming programs in high school, an evaluation of high school farming programs, how they became established in farming, and farming status in 1964.

Findings. Almost 80 per cent of the graduates indicated that their farming programs were either very effective or somewhat effective in developing interest in farming. Major factors influencing a graduate's decision to farm were preference for outdoor work and farm life, desire for independence, being raised on a farm, liking to work with livestock and crops, and having a good start available. Parents were found to be of the greatest assistance to a graduate's establishment in farming, either by providing financial help or by providing a partnership arrangement.

Values of farming programs rated above average in accomplishment were providing necessary record keeping experiences, giving a good view of farming as an occupation, providing technical knowledge for farming, leading to the use of new practices on the home farm, and developing desirable parent-son relationship. Those values receiving a lower than average rating were providing an overall view of the investment and operating expenses required in farming, providing an opportunity to make managerial decisions, resulting in more desirable work habits, contributing to the attractiveness of the home farm, and providing an opportunity to use credit and establish a credit rating.

46. STITT, THOMAS RUSSELL. The Understandings and Abilities Needed for Selected Job Titles of Farm Equipment Dealerships in Ohio. Dissertation, Ph.D., 1967, The Ohio State University, 307 pp. Library, The Ohio State University, Columbus.

Purpose. To determine employment opportunities and make recommendations on curriculum for a program of vocational education in agriculture to prepare high school students to make a successful entry in specific job classifications of Set-up Man, Shop Foreman, Equipment Mechanic, Parts Man, Equipment Salesman, and Truck Driver-Delivery Man in equipment dealerships.

Method. Data were secured from the written responses of 270 of the 493 members affiliated with Farm and Power Equipment Retailers of Ohio and from a personal interview with a random sample of dealership managers. Recommendations on items to be included in the curriculum were secured for 92 items ranked on a 0 to 4 scale by dealership interviews.

Findings. The projected total of employees needed on a full-time basis was 2,753 and part-time was 681. The largest projected need was for equipment mechanics with a total of 1,086 by 1971; followed by set-up man, 553; parts man, 327; salesman, 371; truck driver-delivery man, 210; and foreman, 146. The average hourly salary was truck driver, $1.89; set-up man, $1.93; equipment salesman, $2.31; equipment mechanic, $2.46; parts man, $2.62; and shop foreman, $2.94.

There exists an interrelationship between the abilities and understandings which requires that both be incorporated into the curricula for the six job titles. Sufficient information is available, as a result of this study, to support the recommendations of curricular content materials for the six job titles.

47. THACKER, JAMES H. Pre-College Experience as Preparation for Success in a College of Agriculture. Thesis, Ed.D., 1967, University of Missouri, 156 pp. Library, University of Missouri, Columbia.

Purpose. To determine whether students who study vocational agriculture in high school prior to enrollment in the college made comparable academic achievements in agricultural, non-agricultural, and all subjects taken during the freshman year comparable to students without this experience; to determine whether college performance differs by background of units in vocational agriculture; and to determine the value of freshman placement scores in estimating a student's capacity for achievement in agricultural, non-agricultural, and total subjects.

Method. The records of 246 male students who enrolled as freshmen in the College of Agriculture at the University of Missouri during the 1959 summer and fall registrations and the 1960 spring registration were examined and used in the study. They were divided into three groups: those with four units of high school vocational agriculture; those with one, two, and three units; and those with no units. Students were further grouped according to whether they had completed two semesters of academic work in the College of Agriculture; eight semesters; transferred, withdrew, or dropped out during the eight semesters; or graduated after completing eight semesters. Teacher-assigned grades were used as criteria for measuring achievement in agricultural, non-agricultural, and all subjects. Scholastic aptitude and ability were determined by freshman placement test scores from the *Missouri English Placement Test* and the *School and College Ability Test, Form 1A*

Findings. The coefficients of correlation between freshman grades in agricultural, non-agricultural, and all subjects taken and a single or any two measures of scholastic aptitude and ability did not yield relationships sufficient in size to use any single variable alone as a predictor of freshman grades. The joint action of the four predictor variables provided a slightly higher predictive value of freshmen grades than the two best predictors but was not of sufficient size to be used as joint predictors of freshmen grades.

The analysis of variance comparisons between freshmen grades for students reporting varying units of vocational agriculture were not sufficient in size to show significant differences; neither were the comparisons between freshmen placement-test scores.

The t test comparisons were sufficient in size to show significant differences between groups of students on freshmen grades and all freshmen placement-test scores. There was a significant difference at the .01 level in agricultural, non-agricultural, and all subjects taken between students who completed eight semesters of academic work and those who completed two and four semesters. A significant difference was shown at the .05 level in agricultural and non-agricultural subjects between students who completed eight semesters and those who completed six semesters and at the .01 level in total subjects.

48. VALLAGER, EMIL. An Evaluation of the Relative Importance Assigned to Selected Abilities by Employers in Nonfarm Agricultural Occupations in the Wahpeton, North Dakota, Area. Research paper, M.S., 1967, North Dakota State University. Library, Department of Agricultural Education, Fargo.

Purpose. To determine the relative importance assigned to selected abilities by employers in nonfarm occupations of an agricultural nature.

Method. A questionnaire based on major abilities selected from the teaching program in vocational agriculture of the Wahpeton public school was developed. Additional abilities were included after conferences with faculty members and persons employed in nonfarm agricultural occupations. The abilities were grouped into the following six major areas: leadership, agricultural business, agricultural mechanics, crop science, horticulture, and livestock science. Interviews were made in 25 businesses and agencies in the Wahpeton area.

Findings. Leadership abilities were rated highest in importance of any of the six areas included in the study. Agricultural business abilities were rated almost as high in importance as leadership abilities. Agricultural mechanics abilities were rated next in importance. Crop, horticulture, and livestock abilities were rated much lower in importance by employers than leadership and agricultural business abilities.

49. WALL, KENNETH H. Problems of Beginning Teachers of Vocational Agriculture in Wisconsin. Thesis, M.S., 1966, Wisconsin State University-River Falls, 49 pp. Library, Wisconsin State University, River Falls.

Purpose. To identify problems of beginning teachers of agriculture as perceived by beginning teachers, experienced teachers, and administrators; and to evaluate suggestions for minimizing or eliminating those problems.

Method. Wisconsin vocational agriculture instructors with less than five years experience and randomly selected experienced teachers and principals were contacted. The questionnaire listed problems which were evaluated regarding degree of difficulty in solving. A second portion of the questionnaire was concerned with suggestions for helping the beginning teacher.

Findings. Beginning teachers felt that lack of time for instruction was their most serious problem. Next in importance were problems in obtaining and handling teaching materials and meeting individual student differences. Motivation and handling student behavior problems ranked low in degree of difficulty in solving. The supervising teachers and principals disagreed sharply and expressed the viewpoint that motivation and student behavior were the problems of most concern.

The problem of time to do a satisfactory job was of major importance in the viewpoint of beginning teachers as it applied to development of FFA programs, experience programs, and instruction for young and adult farmer groups. Other assignments, excessive reports, and the retention of high quality students were also expressed as major areas of concern by all responsible.

Helps for beginning teachers which proved most effective were workshops to develop technical knowledge, small group teacher conferences, and area agricultural teacher organizations.

50. WALLACE, JAMES HOWARD. Why Teachers of Vocational Agriculture in Kansas Leave the Field. Master's report, 1967, Kansas State University. Library, Kansas State University, Manhattan.

Purpose. To determine why teachers of vocational agriculture leave the field.

Method. A questionnaire was mailed to 56 former teachers of vocational agriculture. Ninety-two per cent of the questionnaires were returned.

Findings. Forty-two (84.5 per cent) of the 52 respondents were Kansas residents at the time of the study. Five lived in four states other than Kansas and three in foreign countries. Forty-three occupations were pursued by the 52 respondents; education and extension occupied 51.3 per cent of the former teachers.

Fifty per cent of the teachers had no plans on tenure when entering the profession, but seven who planned to make teaching a career ended teaching in five years or less. Administrators were not a cause of respondents leaving the profession in 85 per cent of the cases. Eighteen (31.4 per cent) of the teachers who left the profession had a Master's degree. Superior lesson preparation was considered "very essential" or "essential" by 49 (94.2 per cent) of the respondents, while discipline problems were "no factor in leaving" as shown by 40 (81.6 per cent). Over 80 per cent of the former vocational agriculture teachers were pleased with their training in agricultural education at KSU, and would advise young men to use it as a "stepping stone."

The average annual salary of the respondents was $7,736.75 at the time of the study compared to $6,707.00 for the 186 vocational agriculture teachers in Kansas for the 1965-66 school year. Twenty-four (46.1 per cent) of the 52 respondents indicated they were "very dissatisfied" or "somewhat dissatisfied" with opportunities for advancement in vocational agriculture teaching profession. One hundred per cent of the respondents were "highly satisfied" or "reasonably well satisfied" with their present occupation. Eighty-eight per cent of the 52 respondents indicated they were "highly satisfied" or "reasonably well satisfied" as to the agricultural education curriculum providing helpful instruction towards present occupation. The 52 former teachers indicated that their first reason for leaving the profession was "limited opportunity for advancement;" second, "salary not commensurate with work;" and third, "too many extracurricular activities." One-half of the former teachers indicated that they would consider returning to the profession.

51. WHITE, ROBERT H. The Education of Ornamental Horticulture Technicians in Ohio. Thesis, Ph.D., 1967, The Ohio State University, 298 pp. Library, The Ohio State University, Columbus.

Purpose. To determine occupational opportunities for technicians in Ohio and to propose curricula for the education of ornamental horticulture technicians.

Method. A questionnaire was designed and mailed to a 50 per cent sample of potential employers of ornamental horticulture technicians in Ohio. The selected population represented more than 1,900 possible technician employment sources. A 58 per cent return of the questionnaire was obtained and validated by a telephone survey of a randomly selected sample of nonrespondents. A study of similar ornamental horticulture technician programs outside Ohio identified six types of technicians for which curricula were subsequently developed. A jury of experts in Ohio ranked technical topics to determine order of importance for technical courses and the rankings were tested for significance by the use of Kendall W.

Findings. The six identified types of technicians were: arboriculture and park management, floriculture, greenhouse and nursery, landscape, turf, and general ornamental horticulture. An estimated 807 technicians were employed during 1966, of which 40 per cent were in landscape. The largest numbers of technicians were located in northeast Ohio. There were more openings than qualified technicians, with an almost three-fold increase in technician positions expected during the six years from 1966 to 1972. Qualified technicians were considered acceptable between the age range of 19 to over 60 years. Starting salaries for 12-month positions approximated $500 monthly, with maximum salaries ranging above $8,500 annually.

The need for technicians was sufficiently great to warrant a recommendation of 16 continuing post-secondary programs in Ohio. Curricula were proposed for the technical programs and the rankings of technical topics provided the basis for inclusion of technical courses. The proposed curricula were 21 months in duration, incorporated common courses among program types, included four and one-half months of work experience, and provided 105 to 108 quarter hours of credit. Standards of the Ohio Board of Regents and the Department of Education were considered and met in the proposed curricula.

52. WOODIN, RALPH J. Readers' Reactions to the Agricultural Education Magazine. Staff study, 1966, The Ohio State University, 10 pp. Library, The Ohio State University, Columbus.

Purpose. To secure suggestions for improving The Agricultural Education Magazine in terms of its content and format.

Method. The August, 1964, issue included a survey sheet which was sent to 8,000 subscribers. One hundred and fifty usable returns were received. To supplement these returns, 600 additional subscribers were selected at random and were mailed copies of this survey. A total of 129 returns were received from this group, making a total of 279 usable surveys. The information was tabulated and organized into seven major tables. In addition, the free responses of the respondents were categorized and analyzed.

Findings. The magazine was read by a majority of subscribers; 73 per cent reported reading over 50 per cent of the content of each issue. The magazine also received a higher rating than did such comparable publications such as The American Vocational Journal, NEA Journal, and The Education Digest. The twelve sections in the magazine received ratings ranging from average to excellent. Teachers generally wanted more articles written by other teachers. They expressed interest in courses of study, lesson plans, teaching procedures, and similar topics. Changes in the magazine, such as adding color to the inside pages or increasing the size of the magazine, were believed to be of some value but not of great value in improving the magazine.

53. WOODIN, RALPH J. The Supply and Demand of Teachers of Vocational Agriculture in the United States for the 1965-66 School Year. Staff study, 1966, The Ohio State University, 10 pp. Library, The Ohio State University, Columbus.

Purpose. To provide information on the employment and the availability of teachers of vocational agriculture in the United States by states and regions. Specifically, the study sought (1) to determine the number of graduates in agricultural education in the United States who were qualified during the 1965-66 school year; (2) to identify the positions entered by these graduates and the number entering each position; (3) to determine the number of vocational agriculture teacher replacements required during the 1965-66 school year; (4) to determine the number of teachers currently teaching with temporary or emergency certificates; (5) to determine the various types of positions in teaching vocational agriculture; and (6) to secure an estimate of the number of teachers of vocational agriculture which would be required by the year 1970.

Method. A mail questionnaire elicited responses from state supervisors in 49 states. The chairmen of all departments preparing teachers of vocational agriculture were also surveyed to determine the number of graduates which their institutions had qualified during the period from June 30, 1965 to July 1, 1966. They were also asked to indicate the number of those qualified graduates who had entered teaching and related occupations. Replies were received from 75 institutions, which included all those having qualified graduates.

Findings. The shortage of vocational agriculture teachers in the nation appeared to be serious. One thousand and seventy-seven replacements were required during the 1965-66 school year, and 162 teachers were needed but unavailable. Two hundred and sixty-five teachers were teaching with temporary or emergency certificates. Supervisors estimated that 11,257 teachers would be required by 1970 as compared to 10,325 employed during the current year. Regarding the type of teaching positions in vocational agriculture, 20.5 per cent were in multiple teacher departments; 27.3 per cent involved the teaching of high school classes only; and 8.8 per cent of teachers taught one or more separate courses in vocational horticulture while 5.8 per cent of teachers had one or more separate classes for off-farm occupations in agricultural business and service.

Of the 11,151 qualified graduates, only 706 or 61.4 per cent entered teaching. Of those who did not enter teaching, 115 entered graduate work, 94 other work, 81 entered the armed forces, 62 were teaching other subjects, 62 were in farm sales service and supply, and 31 were farming.

54. WOODIN, RALPH J. Supply and Demand for Teachers of Vocational Agriculture in the United States for the 1966-67 School Year. Staff study, 1967, The Ohio State University. Library, The Ohio State University, Columbus.

Purpose. To determine the number of teaching positions in vocational agriculture in high schools in the United States and the number of graduates of agricultural education programs qualified to fill such positions. In addition, the study attempted to determine the number of teachers required by the year 1970 as well as the types of positions which teachers might expect to enter in the future.

Method. Each State Supervisor of Vocational Agriculture was sent a questionnaire regarding teaching positions in his state in October of 1966. Chairmen of all teacher education departments preparing teachers of vocational agriculture were asked to indicate the number of graduates and the positions which they had assumed by October 1, 1966. Data were assembled showing the number of teaching positions, the extent of the shortage of teachers, the types of teaching positions and the number of positions by states. The occupations of the 1965-66 graduates in agricultural education were shown, as well as the supply of these from each state.

Findings. A total of 10,325 positions in teaching vocational agriculture were reported and 1,077 replacements were required during the school year. One hundred and sixty-two teachers were needed but not available in October, 1966. There were also 252 teachers with temporary or emergency teaching certificates. Added together, this represents a shortage of nearly 40 per cent of the total number of replacements.

Only 61 per cent of the qualified graduates in agricultural education entered teaching. Other occupations which they entered included graduate work, the armed forces, teaching other subjects, farm sales service or supply, farming and other work.

The widespread shortage of teachers was indicated by the fact that only nine states indicated that they had enough teachers. Supervisors estimated that by 1970 the number of teachers of vocational agriculture would increase from 1,325 to 11,257 which will make the teacher shortage even more severe.

55. ZIKMUND, DALE G. Employment Opportunities in the Retail Farm Machinery Industry in Nebraska. Thesis, M.S., 1967, University of Nebraska, 99 pp. Library, University of Nebraska, Lincoln.

Purpose. To determine employment opportunities in the retail farm machinery industry in Nebraska.

Method. All the licensed retail farm machinery dealers in Nebraska were first stratified into three groups according to the annual gross sales of the business. A 33 per cent random sample was drawn within each stratum. There was a total of 155 dealers in the total sample; 40 large dealers (gross sales of $500,000 or more), 50 medium dealers (gross sales of $200,000 to $499,999), and 38 small dealers (gross sales of $199,999 or less). Data were collected by mail survey. Of the total sample, 87 per cent responded. Employees were identified by occupational areas and groups of job titles. The following six occupational areas were used in this study: manager, departmental manager, sales, clerical, parts, and service.

Findings. The respondents indicated they employed 556 full-time employees, exclusive of managers, in 1962; 670 in 1967; and estimated they would employ 881 in 1972. Using those persons whose age was 61 or over in 1967 and calculating retirement at age 65, it was estimated there would be a need for 47 replacement employees between 1967 and 1972. Projections made to the total population indicated there were a total of 2,353 full-time employees in 1962, 2,811 in 1967, and an estimated 3,402 employees in 1972. An additional 201 full-time employees will also be needed by 1972 due to retirement. Therefore, the data show a need for 891 new full-time employees and 201 full-time replacement employees by 1972.

Employers indicated they presently employed 402 full-time general managers and would employ 436 in 1972. It was estimated there will exist a need for 50 replacement general managers by 1972.

The numbers of new and replacement full-time employees needed by 1972 are as follows: 72 new and 8 replacement departmental managers; 552 new and 16 replacement sales personnel; 535 new and 31 parts personnel; 1,887 new and 88 replacement service personnel; and 360 new and 8 replacement clerical personnel. Employers indicated they would need 187 new part-time employees by 1972.

More employers indicated that they employed persons with a high school education than any other educational level.

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